

## CLAIMS

1. A demodulation method comprising:  
a log-likelihood ratio calculation step  
5 for calculating soft-decision input values of Turbo  
decoding upon receipt of a sequence of received  
signal points, performing Turbo decoding using the  
soft-decision input values, and calculating a log-  
likelihood ratio of a low-order information bit and  
10 a log-likelihood ratio of a parity bit;

a coset estimation step for estimating  
the low-order information bit based on the log-  
likelihood ratio of the low-order information bit  
calculated by said log-likelihood ratio calculation  
15 step, estimating the parity bit based on the log-  
likelihood ratio of the parity bit calculated by  
said log-likelihood ratio calculation step, so as  
to estimate a coset based on the low-order  
information bit and the parity bit; and

20 high-order information bit estimation  
step for estimating a transmitted signal point  
based on the coset estimated by said coset  
estimation step, so as to estimate the high-order  
information bit based on the transmitted signal  
25 point.

2. The demodulation method according to  
claim 1, characterized in that said log-likelihood  
ratio calculation step calculates an Euclidean  
30 distance from a threshold value of a signal point

constellation in a signal state space and uses the calculated distance as soft-decision input values of the Turbo decoding.

5           3. The demodulation method according to claim 2, characterized in that said log-likelihood ratio calculation step performs the Turbo decoding for calculating a branch metric of trellis using a linear sum of the soft-decision input values, so as  
10 to calculate the log-likelihood ratio of the low-order information bit and the log-likelihood ratio of the parity bit.

15           4. The demodulation method according to claim 1, characterized in that said log-likelihood ratio calculation step performs the Turbo decoding that includes conversion.

20           5. The demodulation method according to claim 1, characterized in that said log-likelihood ratio calculation step calculates an Euclidean distance from a threshold value of a signal point constellation in a signal state space so as to use the calculated distance as the soft-decision input  
25 values of the Turbo decoding that includes conversion, performs the Turbo decoding whereby a branch metric of trellis is calculated using a linear sum of the soft-decision input values, so as to calculate the log-likelihood ratio of the low-  
30 order information bit and the log-likelihood ratio

of the parity bit.

6. A demodulation apparatus comprising:  
log-likelihood ratio calculation means

5 for calculating soft-decision input values of Turbo  
decoding upon receipt of a sequence of received  
signal points, performs Turbo decoding using the  
soft-decision input values, and calculating a log-  
likelihood ratio of a low-order information bit and  
10 a log-likelihood ratio of a parity bit;

a coset estimation means for estimating  
the low-order information bit based on the log-  
likelihood ratio of the low-order information bit  
calculated by said log-likelihood ratio calculation  
15 means, estimating the parity bit based on the log-  
likelihood ratio of the parity bit calculated by  
said log-likelihood ratio calculation means, so as  
to estimate a coset based on the low-order  
information bit and the parity bit; and

20 high-order information bit estimation  
means for estimating a transmitted signal point  
based on the coset estimated by said coset  
estimation means so as to estimate a high-order  
information bit based on the transmitted signal  
25 point.

7. The demodulation apparatus according  
to claim 6, characterized in that said log-  
likelihood ratio calculation means calculates an  
30 Euclidean distance from a threshold value of a

signal point constellation in a signal state space and uses the calculated distance as soft-decision input values of the Turbo decoding.

5           8. The demodulation apparatus according to claim 7, characterized in that said log-likelihood ratio calculation means performs the Turbo decoding for calculating a branch metric of trellis using a linear sum of the soft-decision  
10 input values, so as to calculate the log-likelihood ratio of the low-order information bit and the log-likelihood ratio of the parity bit.

15           9. The demodulation apparatus according to claim 6, characterized in that said log-likelihood ratio calculation means performs the Turbo decoding that includes conversion.

20           10. The demodulation apparatus according to claim 6, characterized in that said log-likelihood ratio calculation means calculates an Euclidean distance from a threshold value of a signal point constellation in a signal state space so as to use the calculated distance as the soft-  
25 decision input values of the Turbo decoding that includes conversion, performs the Turbo decoding whereby a branch metric of trellis is calculated using a linear sum of the soft-decision input values, so as to calculate the log-likelihood ratio  
30 of the low-order information bit and the log-

likelihood ratio of the parity bit.

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